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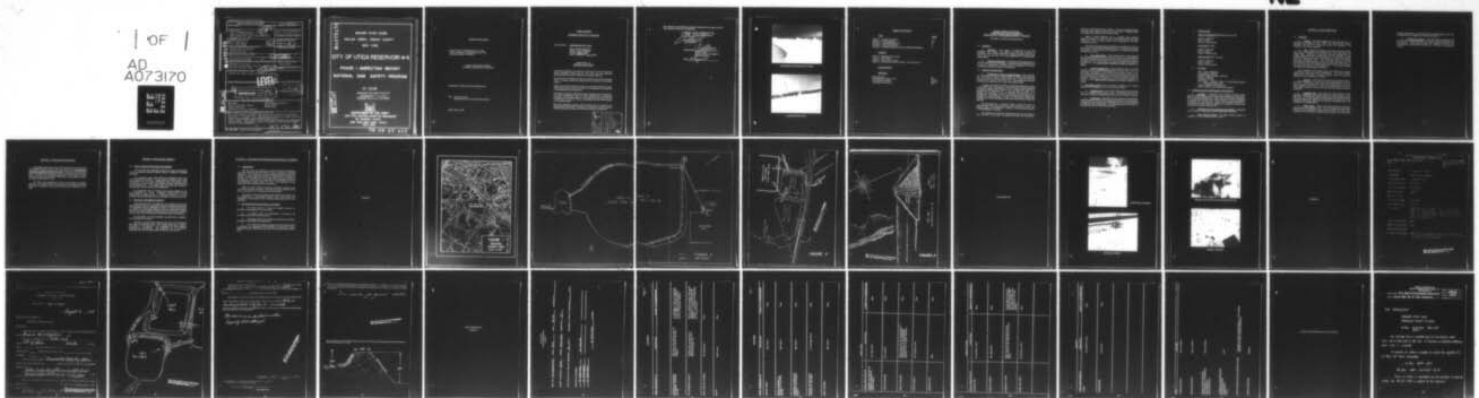
NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/6 13/2  
NATIONAL DAM SAFETY PROGRAM. CITY OF UTICA RESERVOIR NUMBER 4 (--ETC(U)  
AUG 78 J J WILLIAMS

DACW51-78-C-0035

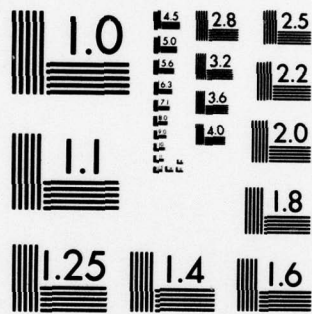
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report City of Utica Reservoir #4 Mohawk River Basin, Oneida County, New York Inventory No. N.Y. 198		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
7. AUTHOR(s) John J. Williams		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS O'Brian and Gere Engineers 1301 Buckley Road Syracuse, New York 13221		8. CONTRACT OR GRANT NUMBER(s) DACW 51-78-C-0935
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007		12. REPORT DATE 16 August 1978
		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
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16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; Distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) <b>LEVEL</b>		
18. SUPPLEMENTARY NOTES National Dam Safety Program. City of Utica Reservoir Number 4 (NY 00198), Mohawk River Basin, Ballou Creek, Oneida County, New York. Phase I Inspection Report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability Utica Reservoir Dam No. 4 Oneida County Ballou Creek		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. City of Utica Reservoir Dam No. 4 was found to have seepage at the downstream spillway apron. Additionally, cutting of vegetation, and filling of animal burrows was also recommended.		

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MOHAWK RIVER BASIN

BALLOU CREEK, ONEIDA COUNTY

NEW YORK

# CITY OF UTICA RESERVOIR # 4

## PHASE I INSPECTION REPORT

## NATIONAL DAM SAFETY PROGRAM

NY 00198

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DEPARTMENT OF THE ARMY

NEW YORK DISTRICT, CORPS OF ENGINEERS

26 FEDERAL PLAZA

NEW YORK, NEW YORK 10007

JULY 1978

79 08 27 027



**MOHAWK RIVER BASIN**

**Name of Dam: Utica Reservoir No. 4 Dam  
County and State: Oneida County, New York  
Inventory Number: NY 00198**

**PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM**

**Prepared by: O'Brien and Gere Engineers, Inc.**

**For: New York State  
Department of Environmental Conservation**

**Date: July 5, 1978**

PHASE I REPORT  
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Utica Reservoir No. 4 Dam

State Located: New York

County Located: Oneida

Stream: Ballou Creek

Date of Inspection: June 5, 1978

ASSESSMENT OF  
GENERAL CONDITIONS

During the inspection, tall grass and vegetation covering the upstream slope, downstream slope, and the dam crest may have obscured potential problem areas or evidence of unstable conditions.

A large number of animal burrows were scattered over the downstream slope. A program should be implemented to eliminate the burrowing rodents.

Water was observed boiling through the downstream spillway apron. Although the water was clear at the time of inspection, a continuance of this seepage could cause piping.

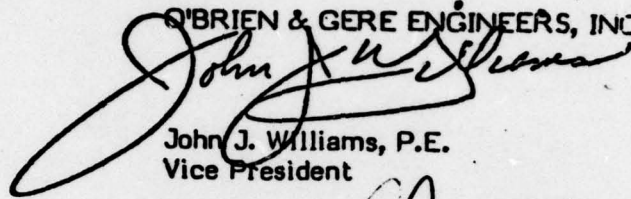
Piezometers should be installed to detect excessive pore pressures in the earth embankment that may have developed due to problems caused by the burrowing rodents. The piezometers can also be an aid in detecting the source of flow to the boiling area that has developed in the spillway apron.

Both the foundation geology and materials used to construct the embankment are unknown. Therefore, an exploratory boring program should be performed concurrent with the piezometer installations.

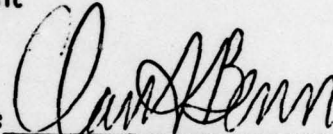
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The reservoir is provided with adequate freeboard for storage of the 48 hour Probable Maximum Precipitation.

O'BRIEN & GERE ENGINEERS, INC.

  
John J. Williams, P.E.  
Vice President

Approved by:

  
Clark H. Benn  
Colonel, Corps of Engineers  
District Engineer

Date:

16 August 78





UPSTREAM FACE AND GATE STEM



DOWNSTREAM FACE



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PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
NAME OF DAM UTICA RESERVOIR NO. 4 ID# 00198

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority - This report is authorized by the Dam Inspection Act, Public Law 92-367, and has been prepared in accordance with Contract #1467.021 between O'Brien & Gere Engineers, Inc. and the New York State Department of Environmental Conservation.

b. Purpose of Inspection - The purpose of this inspection is to evaluate the structural and hydraulic conditions of Utica Reservoir No. 4 Dam and appurtenant structures, and to determine if the Dam constitutes a hazard to human life or property.

1.2 PROJECT DESCRIPTION

a. Description of Dams and Appurtenances - (from information supplied by the City of Utica, Board of Water) Utica Reservoir No. 4 is located in eastern Oneida County and is within the corporate boundary of the City of Utica, New York. The impoundment area was formed by the construction of a dam across Ballou Creek.

The Dam, constructed in 1886, is a rolled earth embankment with a clay puddle core. According to a section drawing (Figure 4) supplied by Russell Logolbo, Chief Engineer, City of Utica Water Board, the embankment for Reservoir No. 5 was constructed in 1896. It is possible, as reported by the City Engineer, that Reservoir No. 4 embankment is similarly zoned, but no design section drawings are available for this structure. In 1896, the embankment height was increased by 10 feet and Ballou Creek flow was diverted around the reservoir.

The structure has a maximum height of about 55 feet, is approximately 1,700 feet long and has a top width of 25 feet. The upstream slope is 2 horizontal to 1 vertical; the downstream slope is 1 3/4 horizontal to 1 vertical.

The spillway is an ungated, broad-crested, concrete weir about 5 feet wide and 31 feet long. The spillway approach and downstream

apron are constructed of stone masonry. The stone wingwalls support a 15 foot wide, wooden decked, steel girder bridge. Clearance under the bridge to the spillway crest is about 5 feet.

Water in Utica Reservoir No. 4 is supplied from Hinckley Reservoir through a 15 mile long, 20 inch diameter conduit. The outlet consists of a 20 inch gated conduit which discharges to the water distribution system.

The Dam and Appurtenant Structures are owned by the City of Utica and are operated by the Board of Water. The primary purpose of the reservoir is for storage and distribution of a treated water supply for the City of Utica.

b. Size Classification - Utica Reservoir No. 4 was designed for a storage volume of 766 acre-feet at the maximum operating pool elevation of 654 feet mean sea level (MSL) and the maximum height of the dam is 55 feet. The structure is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

c. Hazard Classification - Utica Reservoir No. 4 is located within  $\frac{1}{4}$  mile of a residential neighborhood in Utica, New York. The topography downstream of the structure is such that failure of the dam would cause flood waters to be directed towards this area of the City resulting in the possible loss of many lives and extensive property damage. Therefore, the structure is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

### 1.3 PERTINENT DATA (from information supplied by Mr. Russell Logolbo, Chief Engineer, City of Utica, Board of Water)

a. Drainage Area - Due to local topography, Utica Reservoir No. 4 is isolated from surface runoff. The surface area of the reservoir at maximum operating pool (Elevation 654) is about 34 acres.

b. Discharges - Discharge from the reservoir is controlled by valves situated in a valve vault located northeast of the embankment. Spillage from the reservoir over the spillway occurs only during periods of seasonally high precipitation. The operating pool level is known to fluctuate as much as 6 feet during the year.



c. Reservoir Data

Maximum Operating Pool (Reservoir at El. 654)

Length - 1,600 feet  
Area - 34 acres  
Volume - 766 acre-feet

Top of Dam (El. 658)

Length - 1,600 feet  
Area - 34 acres  
Volume - 902 acre-feet

Maximum Pool (PMF - El. 656)

Length - 1,600 feet  
Area - 34 acres  
Volume - 834 acre-feet

d. Dam Data

Type - earth embankment  
Top Elevation - 658 feet  
Original Ground Elevation - 603 feet  
Length - 1,700 feet  
Top Width - 25 feet  
Side Slopes - upstream slope 2:1 (horizontal:vertical);  
downstream slope 1 3/4:1  
Zoning - earthfill with puddle core  
Cutoff - puddle core extends into foundation

1.4 OPERATING AND MAINTENANCE PROCEDURES

a. Operation - According to Mr. LaShure, Engineer, Utica Board of Water Supply, the valves that control outflow are operational and are exercised periodically. These valves are normally maintained in the full open position, with flow controlled at several locations downstream of the reservoir. Inflow from Hinckley Reservoir is controlled at several locations between the reservoirs, but no inflow controls are located at Reservoir #4.

b. Maintenance of Dam and Operating Facilities - According to Mr. LaShure, maintenance is performed as the need arises.

c. Flood Warning System - No flood warning system is presently in effect, according to Mr. LaShure.



## SECTION 2 - VISUAL INSPECTION

### 2.1 FINDINGS

a. General - The field inspection of Utica Reservoir No. 4 embankment took place on June 5, 1978. The reservoir water surface elevation was about 653 feet MSL during the inspection. No underwater areas were inspected.

b. Dam - During the inspection, the entire downstream slope and crest of embankment were covered with 3-foot deep grass and small bushes. Although no indication of slope misalignment was evident, observations were severely limited by the tall grass. A large number of burrow holes were encountered in a random distribution over the downstream face. It is estimated that the average distribution of these burrows is about one every 300 square feet. A four foot square area of standing water was noted at the downstream toe near the center of the embankment. The ground surface surrounding this area appeared saturated.

Visual inspection of the upstream face was inhibited by the dense vegetation covering the entire embankment. The stone masonry riprap, which was visible at random locations around the reservoir, appeared to be in satisfactory condition.

c. Spillway - Clear water was observed boiling (approximately 4 GPM) through two small holes, each approximately 1 inch in diameter, in the masonry apron about 25 feet downstream of the weir crest. Seepage was noted at the base of the downstream face of the east spillway wingwall. There was no flow over the spillway at time of inspection.

d. Reservoir Area - The south and west perimeter of the reservoir is separated from Ballou Creek by a grass-covered 5 foot high dike. The moderately sloping ground beyond the diversion channel and to the east of the reservoir is covered with trees and brush. Two additional distribution reservoirs are situated immediately north and northeast of the embankment.

e. Outlet Works - Three valve stems anchored in concrete were noted on the upstream slope. It did not appear as though these valves had been operated for quite some time since the stems were corroded and the operating assemblies were missing. The valve house

located downstream of the embankment was inaccessible at the time of inspection but it appeared to be well maintained.

f. Downstream Channel - The outlet channel downstream of the structure accepts discharge from Ballou Creek and spillage from the reservoir. The channel is lined with fieldstone and directs the combined flow around Utica Reservoir No. 2 and into an underground culvert.

### SECTION 3 - HYDROLOGY/HYDRAULICS

The design flood used for the Utica Reservoir No. 4 structure is the Probable Maximum Flood (PMF), according to the Recommended Guidelines for Safety Inspection of Dams. The reservoir surface at the maximum operating level (Elevation 654) comprises the entire drainage area. The PMF was considered equivalent to the adjusted 48 hour Probable Maximum Precipitation (PMP) which would raise the reservoir water surface about 2 feet.

The top of the embankment is about 4 feet above the ungated spillway. The storage volume created between the spillway crest and top of dam is adequate to store the entire 48 hour precipitation of the PMP.



## SECTION 4 - STRUCTURAL STABILITY

### 4.1 VISUAL OBSERVATIONS AND DATA REVIEW

The tall grass and vegetation covering the entire embankment may have obscured potential problem areas or evidence of unstable conditions.

Two conditions were noted during the inspection which may affect embankment stability. A large number of animal burrows were encountered over the entire downstream face, and ponded water surrounded by, what appears to be, saturated ground was observed at the downstream toe. The ponded water may have been caused by rainfall that occurred previous to the inspection.

No engineering data or drawings were made available for the Utica Reservoir No. 4 dam. However, a typical section of the embankment for Reservoir No. 5 is depicted in Figure 4. The City Engineer reported that Reservoir No. 4 embankment is similarly zoned.

### 4.2 GEOLOGY AND SEISMIC STABILITY

Utica Reservoir No. 4 is located in the boundary areas of the Hudson-Mohawk and the Appalachian Uplands physiographic provinces. The topography has been developed by erosion of weak outcrops which lie between the Adirondack Mountains and the Appalachian Uplands. Alluvial and glacial deposits existing throughout the province modify this low relief which is underlain by Ordovician shales and siltstones.

No information was made available concerning the composition of the foundation at this site.

The dam is located within Seismic Risk Zone 2 of the Seismic Zone Map of Contiguous States. No faultlines are known to exist in the vicinity of the reservoir and it appears that static stability conditions are satisfactory. No earthquakes of any significant magnitude have been recorded within 50 miles of the structure.



## SECTION 5 - ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

### 5.1 ASSESSMENT

The tall grass and vegetation covering the entire embankment may have obscured potential problem areas or evidence of unstable conditions. The ponded water and surrounding saturated ground may indicate excessive seepage through the embankment or foundation. However, it is possible that the rainfall, which occurred previous to the inspection, may have been responsible for this condition since the local topography grades toward this area. No movement of fine-grained soil was detected during the inspection.

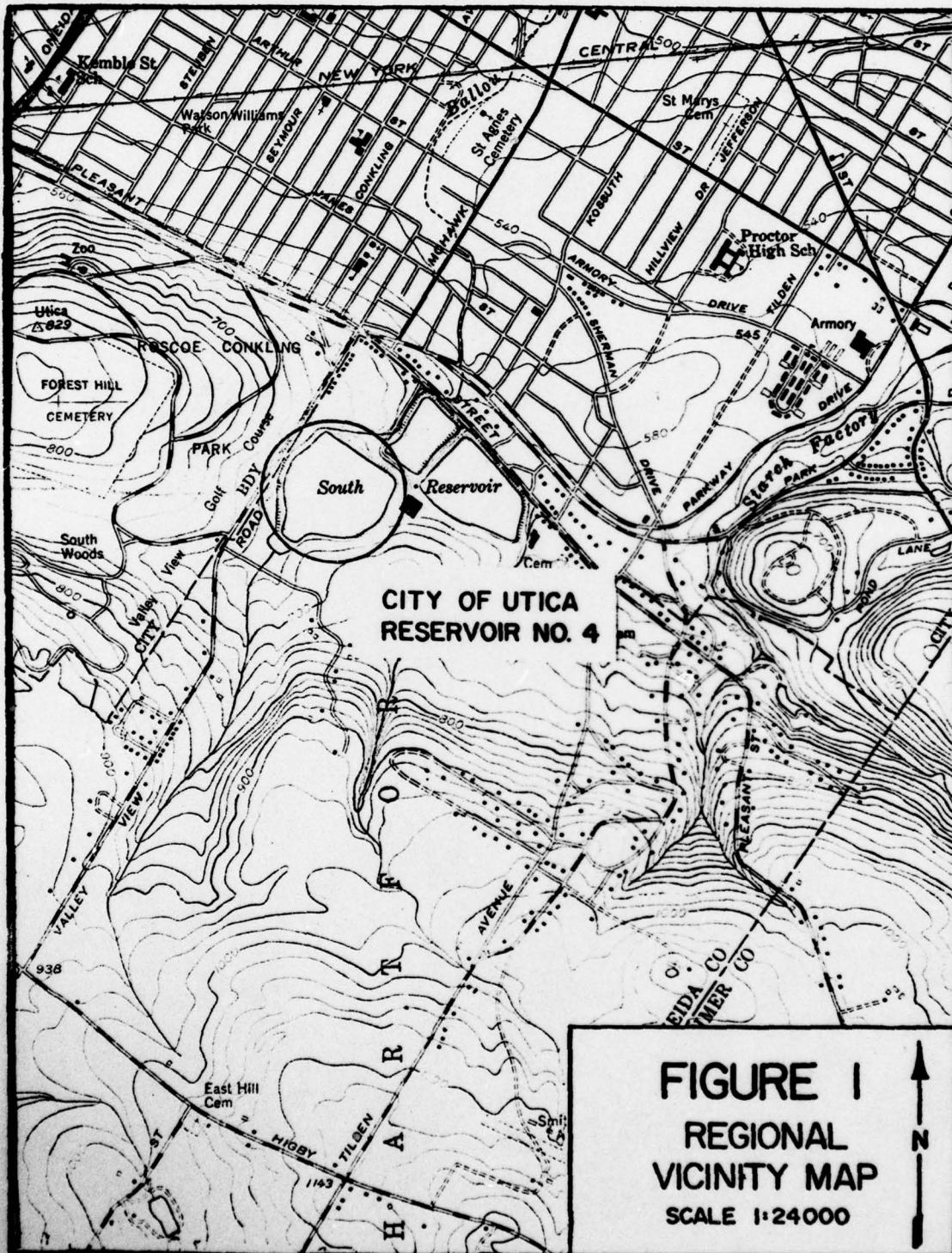
Water was seen boiling through the downstream spillway apron and under the eastern wingwall. Although the water was clear at the time, a continuance of this seepage could cause piping.

The animal burrows on the downstream slope may penetrate into the embankment a considerable distance which may reduce the embankment cross-sectional area and increase the potential for fines migration.

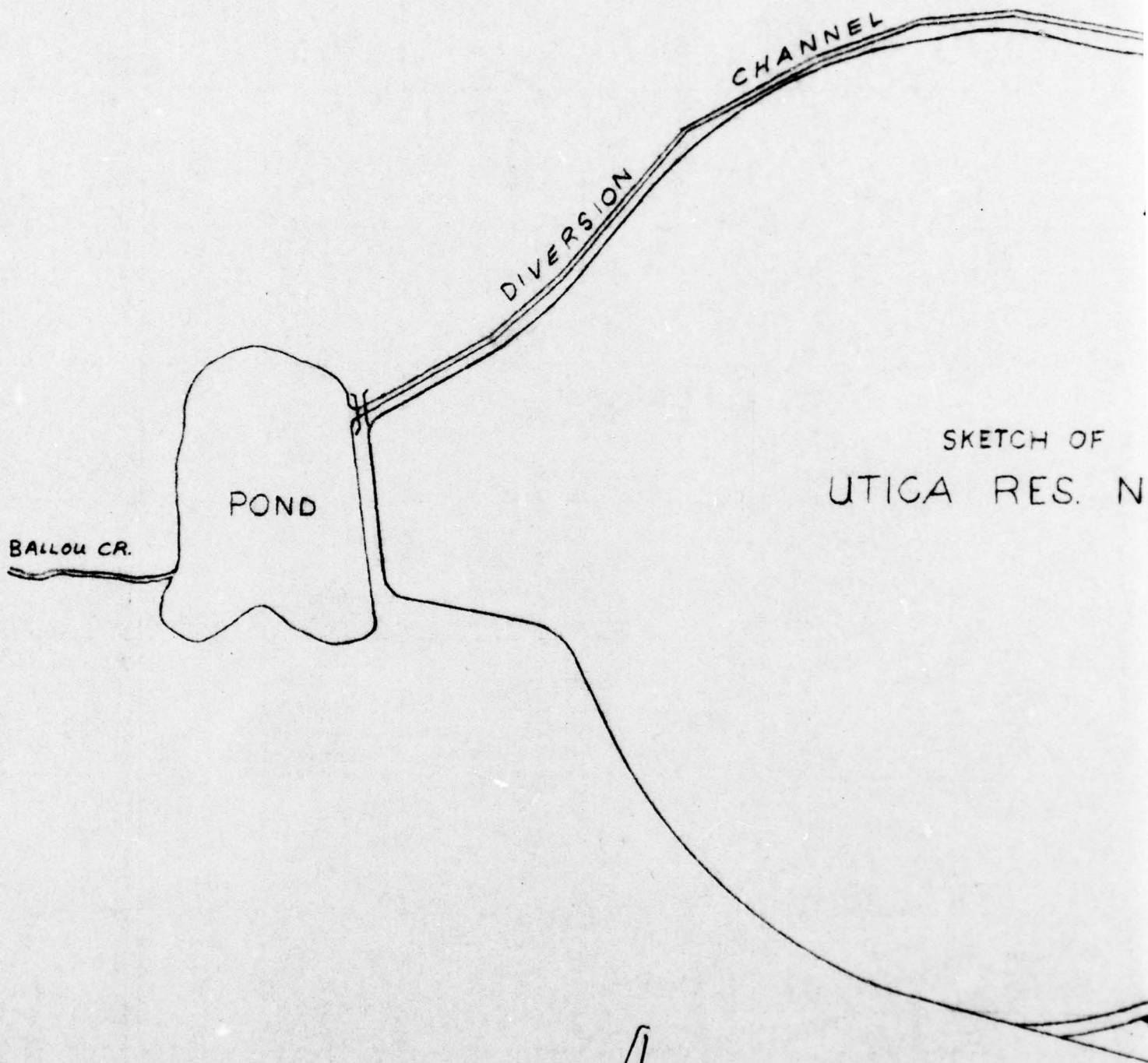
### 5.2 RECOMMENDATIONS/REMEDIAL MEASURES

- 1) The grass should be mowed at frequent intervals to facilitate visual inspection of the structure.
- 2) A program should be implemented to eliminate the burrowing rodents and backfill the holes.
- 3) Piezometers should be installed to monitor pore pressure development throughout the embankment.
- 4) Since both the foundation geology and the materials used to construct the embankment are unknown, an exploratory boring program should be performed concurrent with the piezometer installations.

FIGURES





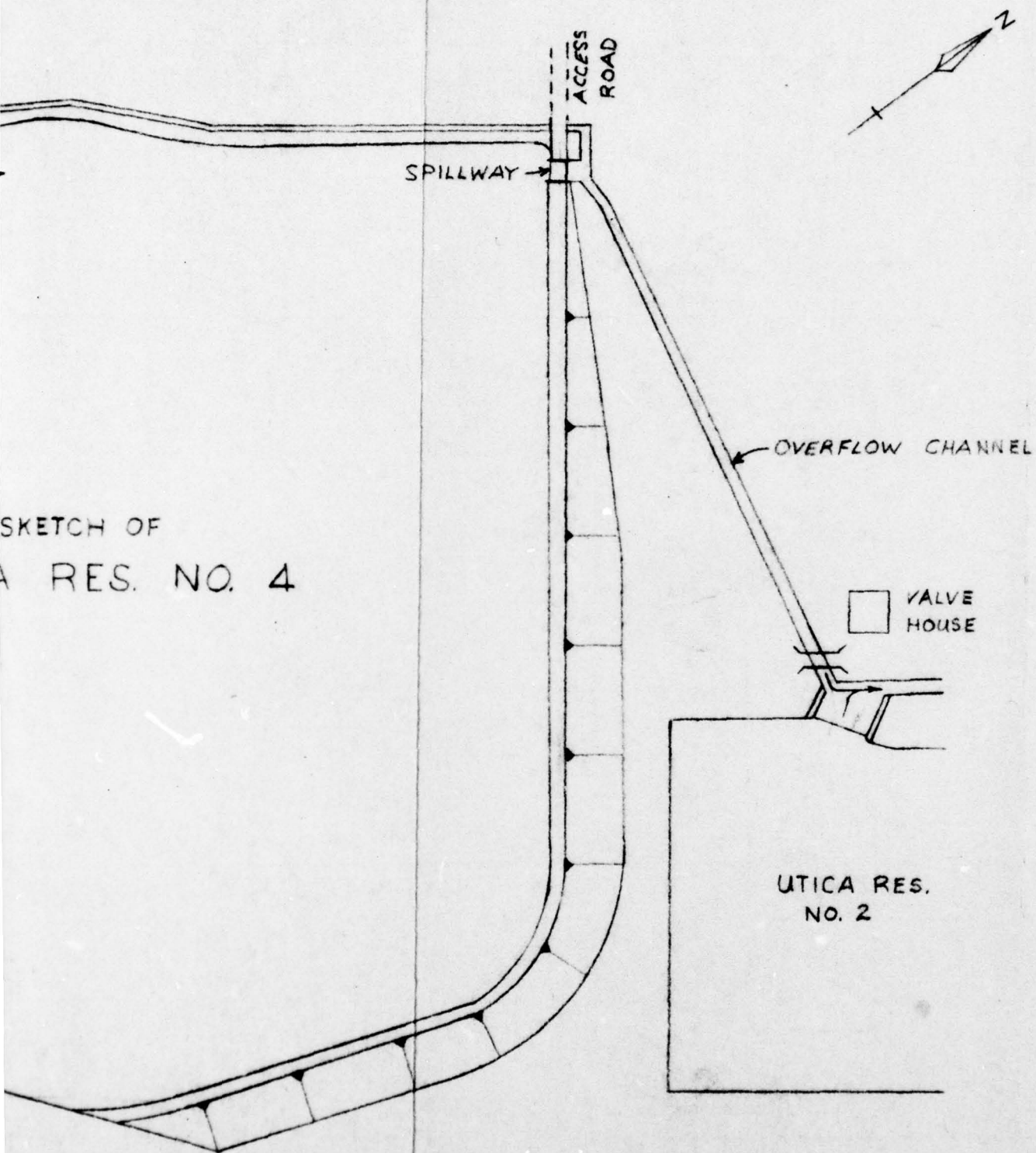


SKETCH OF  
UTICA RES. N

4



SKETCH OF  
A RES. NO. 4

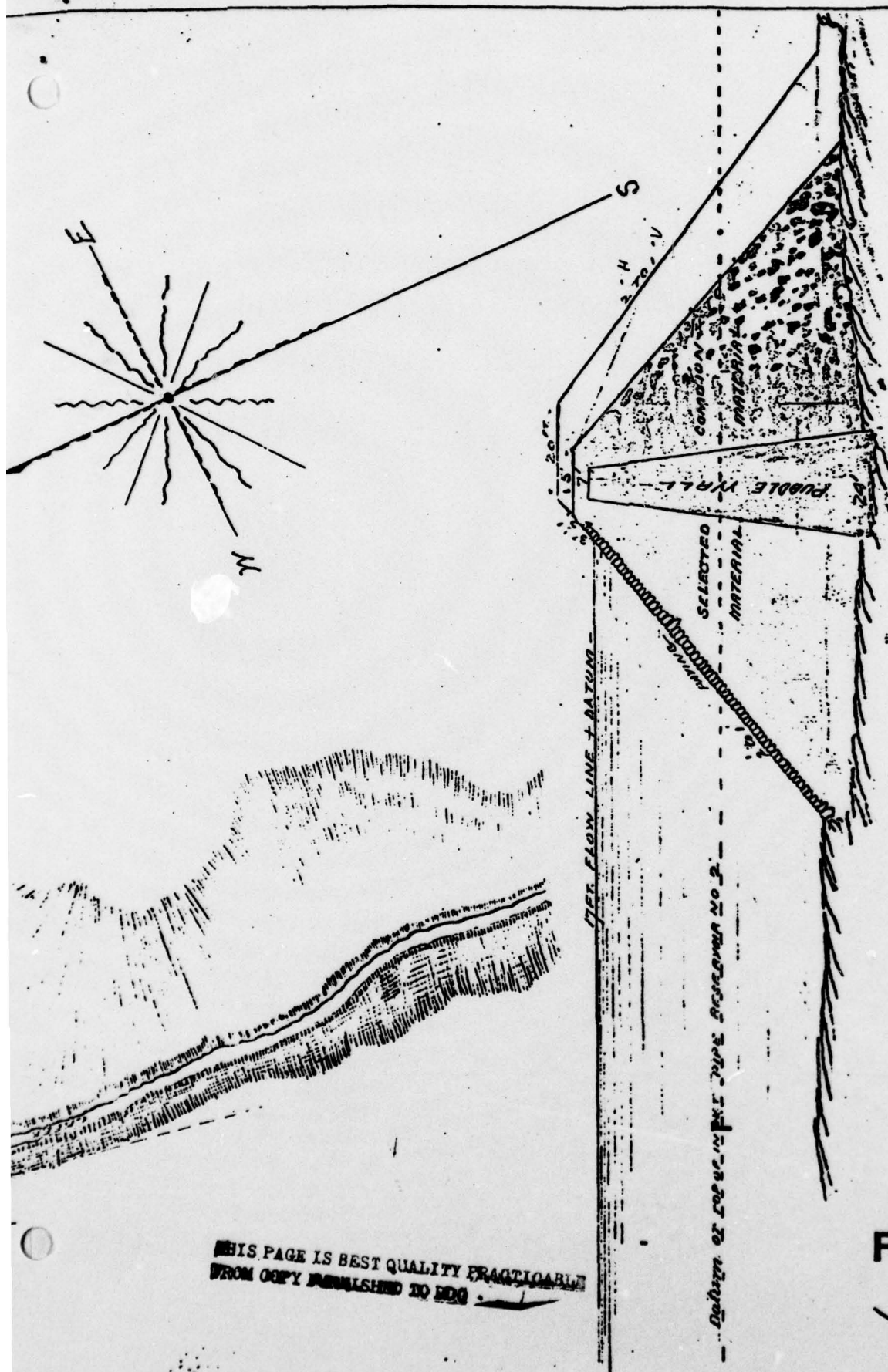


UTICA RES.  
NO. 2

2

FIGURE 2  
NOT TO SCALE





SCALE  
 HOR. 1" = 30'  
 VERT. 1" = 20'

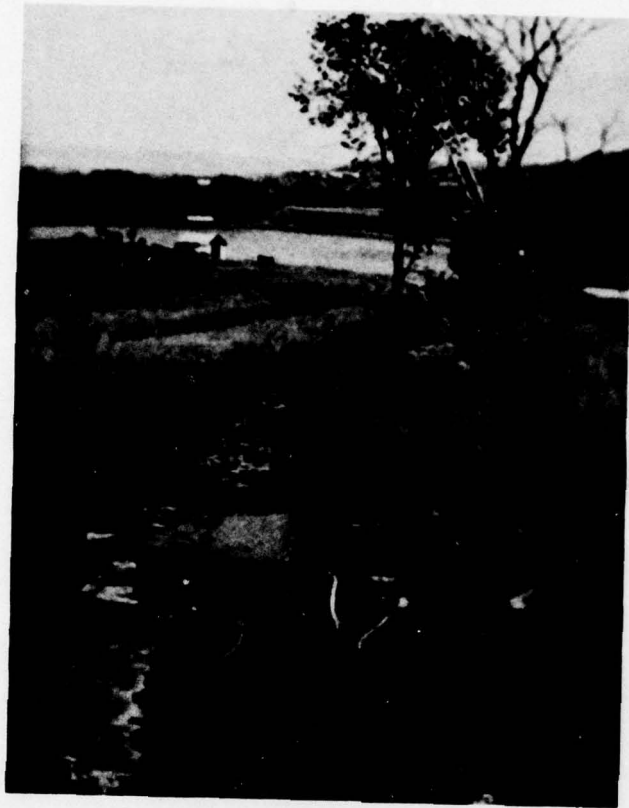
1896 MAP  
 FOR CONSTRUCTION OF "S"

FIGURE 4

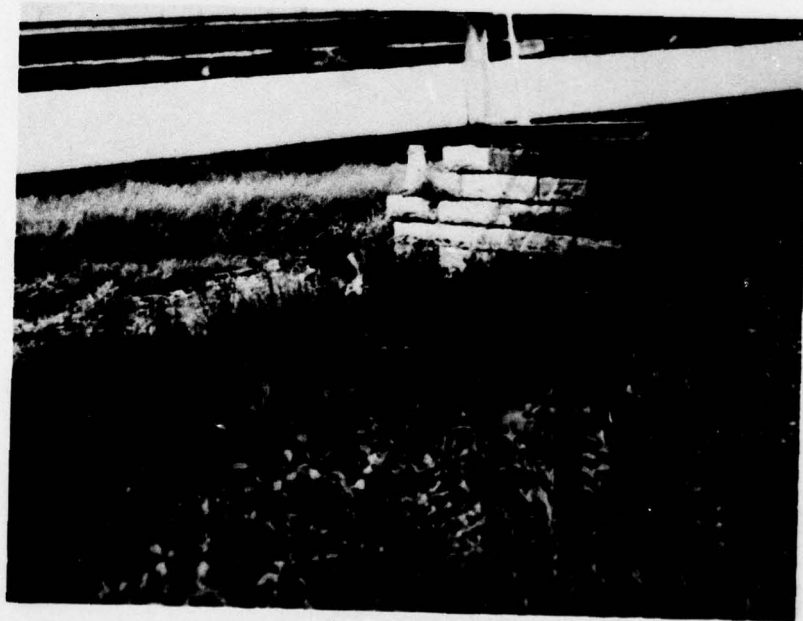
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PHOTOGRAPHS

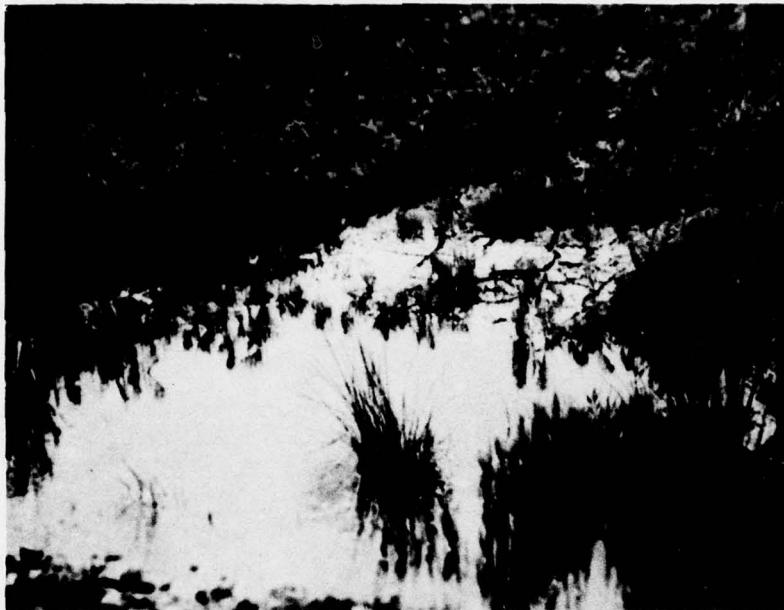


OVERFLOW CHANNEL



SPILLWAY CREST

7



PONDED WATER BELOW DOWNSTREAM TOE



ANIMAL BURROW



APPENDIX

CONSOLIDATED WATER CO. OF UTICA, N. Y.  
ENGINEERING DEPARTMENT

SUBJECT Golden Reservoir

#4

COMP E W. W. White

DATE March 23-1922

CHECK BY \_\_\_\_\_

DATE \_\_\_\_\_

Elevation. High water 654

Capacity. 232 Million gallons.

Area Watershed. 1.4 Sq. miles.

Area Reservoir. 34.3 Acres.

Average Depth. 2 1/2 Feet.

Elev. Outlet. 620 ±

Elev. outlet.

Maximum Depth. 50 Feet.

Elev. Spillway. 654.13

Year Built. 1886 Embankment raised 10 ft. by 1922  
Early embankment with puddle core.  
Top width 25 ft. 1 1/4 ft. inside, 2 ft. outside.  
Max. height 55 ft.

Size of Outlet. 20"

Size of Blowoff. 20"

Elev. of Blowoff.

Source of Supply. Sylvan Glen Brook. also overflow from  
#1 Reservoir by #3 intake.

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ENGINEER: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.

STATE OF NEW YORK  
CONSERVATION COMMISSION  
ALBANY

map 128-2 DAM REPORT

August 6, 1917

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Reservoir No 4 City of Utica Dam.

This dam is situated upon the Ballou Creek  
in the Town of Utica, Oneida County,  
about \_\_\_\_\_ from the Village or City of \_\_\_\_\_  
(State distance)

The distance \_\_\_\_\_ stream from the dam, to the \_\_\_\_\_  
(Up or down) (Give name of nearest important stream or of a bridge)  
is about \_\_\_\_\_  
(State distance)

The dam is now owned by Consolidated Water Co of Utica  
(Give name in full)  
and was built in or about the year \_\_\_\_\_, and was extensively repaired or reconstructed during the year \_\_\_\_\_.

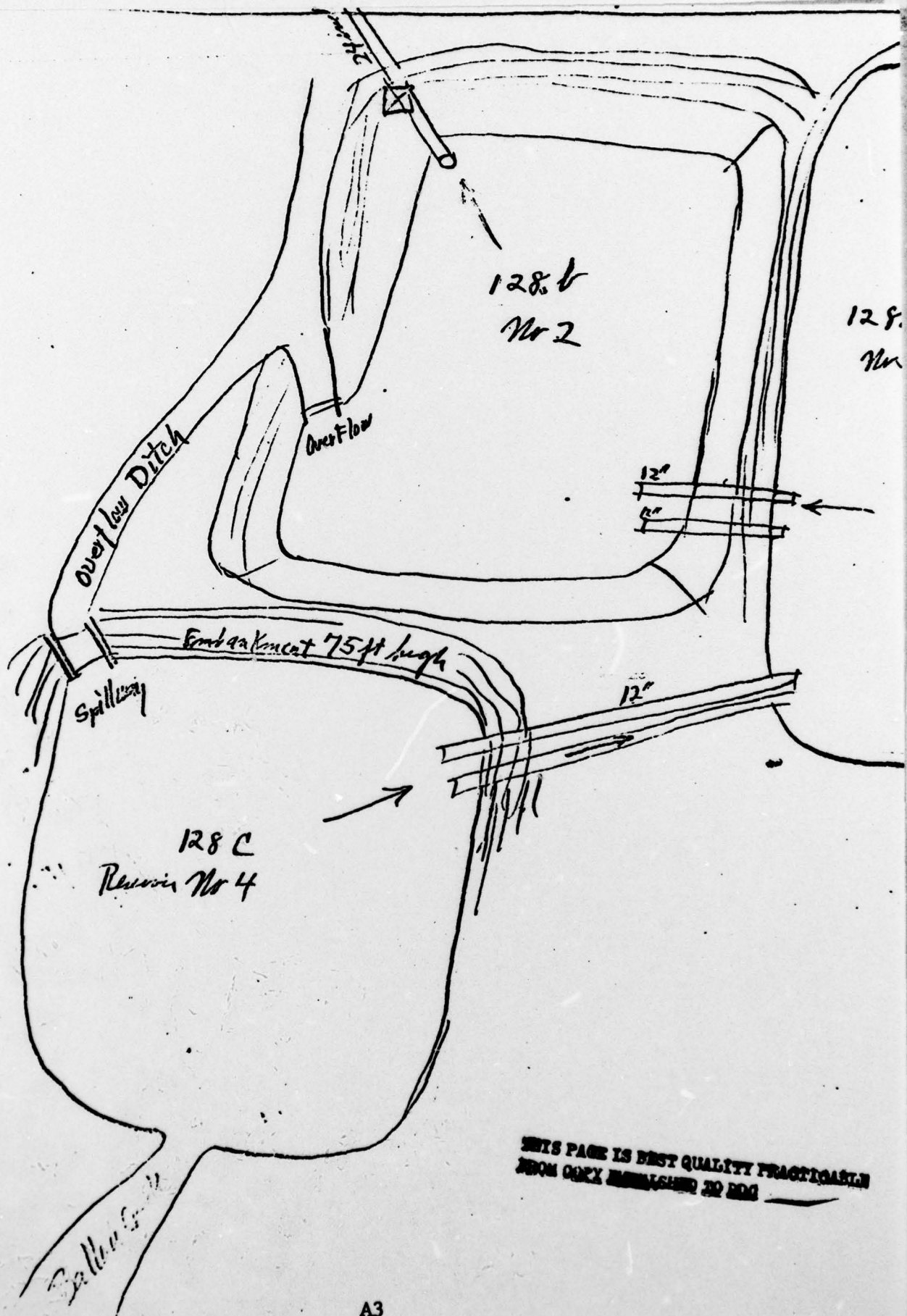
Entire inside slope of Reservoir is cobble lined.  
As it now stands, the spillway portion of this dam is built of \_\_\_\_\_  
(Give name of material)  
and the other portions are built of The earth's embankments are not rock fitted

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is \_\_\_\_\_ and under the remaining portions such foundation bed is \_\_\_\_\_

Soil in neighborhood is loam

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The total length of this dam is \_\_\_\_\_ feet. The spillway or waste-weir portion, is about A spillway 20 ft wide is provided for overflow. feet long, and the crest of the spillway is about \_\_\_\_\_ feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: Water is discharged to No 5 by two 12 in conduits

State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

This reservoir is in excellent condition  
Capacity 250 million gal.

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Reported by Will. J. Plaford  
(Signature)

Conservation Commission, Albany, N.Y.  
(Address—Street and number, P. O. Box or R. F. D. route)

\_\_\_\_\_  
(Name of place)

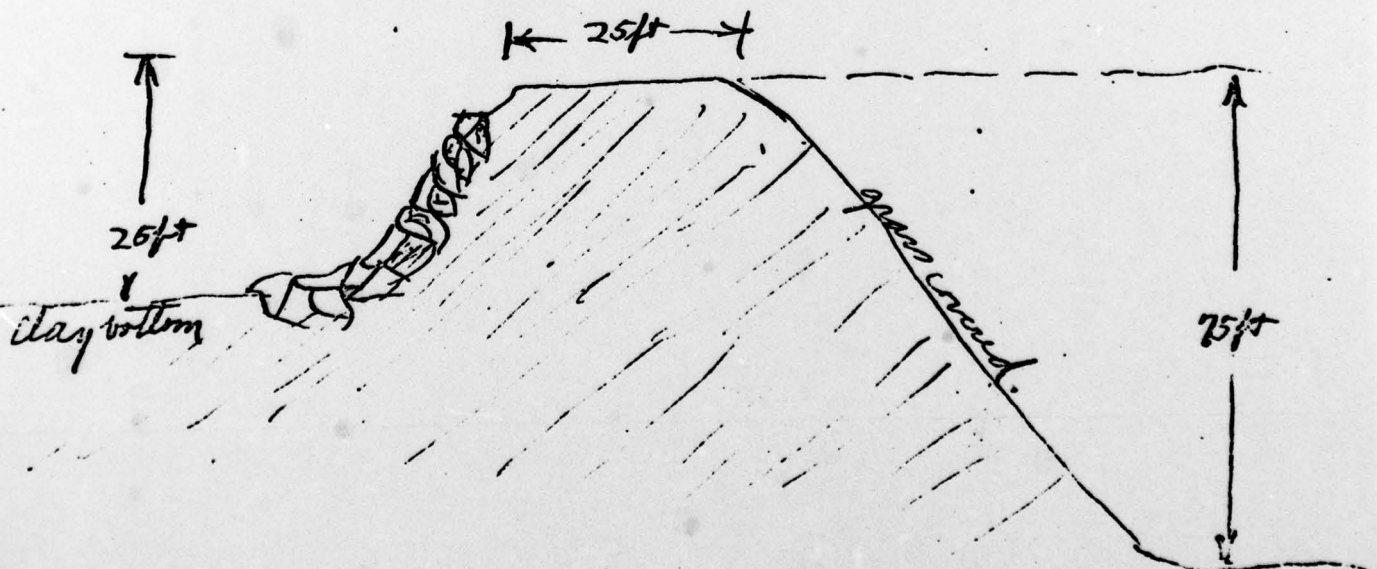
(SEE OTHER SIDE)

(In the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)

*See inside for general sketch.*

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(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)





FIELD INSPECTION  
REPORT

Name	Dam	Utica Reservoir No. 4	County	State	New York	Coordinators
			Oneida			

Date(s)	Inspection	Weather	Partly Cloudy	Temperature	61°

Pool Elevation at Time of Inspection 653 M.S.L. Tailwater at Time of Inspection -- M.S.L.

### Inspection Personnel:

Mr. George Elias \_\_\_\_\_

Mr. James Ryan \_\_\_\_\_

Mr. David Campbell

Mr. Steven Snider

**Mr. Steven Snider**

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Water was seen flowing from the base of the eastern spillway wingwall.	No spillage at time of inspection would suggest that the reservoir is the source of flow and the path of circulation unknown.
ANY NOTICEABLE SEEPAGE	Ponded water surrounded by saturated ground was noted below downstream toe.	May be collected runoff from recent precipitation or seepage through embankment. Source of water not evident. Area should be monitored on a regular basis.
STAFF GAGE AND RECORDER	Not applicable.	None.
DRAINS	None noted.	None.



EMBANKMENT

REMARKS OR RECOMMENDATIONS

VISUAL EXAMINATION OF

OBSERVATIONS

SURFACE CRACKS

None Noted.

None.

UNUSUAL MOVEMENT OR  
CRACKING AT OR BEYOND  
THE TOE

None Noted.

None.

SLOUGHING OR EROSION OF  
EMBANKMENT AND ABUTMENT  
SLOPES

None Noted.

None.

A8

VERTICAL AND HORIZONTAL  
ALIGNMENT OF THE CREST

No problems noted.

None.

RIPRAP FAILURES

None Noted.

None.

# OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not applicable.	None.
INTAKE STRUCTURE	Not visible.	None.
OUTLET STRUCTURE	Valve vault for the 20 inch pipe is located north of the embankment. The building and appurtenances appeared to be in good condition.	None.
OUTLET CHANNEL	No problems noted.	None.
EMERGENCY GATE	None.	None.

# UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	No problems noted.	None.
APPROACH CHANNEL	Not applicable.	None.
DISCHARGE CHANNEL	Water was observed boiling from two small holes in the downstream spillway apron.	No spillage at time of inspection would suggest that the reservoir is the source of flow (see previous note on this feature)
BRIDGE AND PIERS	No problems noted.	None.



**RESERVOIR**

**REMARKS OR RECOMMENDATIONS**

**OBSERVATIONS**

**VISUAL EXAMINATION OF**

**SLOPES**

No problems noted.

None.

**SEDIMENTATION**

None noted.

None.

ITEM

REMARKS

DESIGN REPORTS

None available.

GEOLOGY REPORTS

None available.

DESIGN COMPUTATIONS  
HYDROLOGY & HYDRAULICS  
DAM STABILITY  
SEEPAGE STUDIES

None available.

MATERIALS INVESTIGATIONS  
BORING RECORDS  
LABORATORY  
FIELD

None.

POST-CONSTRUCTION SURVEYS OF DAM

Topographic survey dated December 1, 1910 showing  
contours of basin following regrading.

BORROW SOURCES.

Unknown.

HYDROLOGIC/HYDRAULIC CALCULATIONS



JUSTIN & COURTNEY, INC.  
Division of O'Brien & Gere Engineers, Inc.  
PHILADELPHIA, PA

NAME OF CLIENT N.Y. Dept. of Environmental Conservation

PROJECT Utica Res. No. 4 Dam Inspection

SHEET NO. 1 OF 1

DATE 6/20/78

COMP. BY S.H.S.

CHECKED BY \_\_\_\_\_

## PMP HYDROLOGY

DRAINAGE Area - none

RESERVOIR Area  $\approx$  14 acres

6-Hour 10 SQ. Mile PMP = 22"  
Zone = 1

The drainage area is considered equal to the reservoir area.

Since the surface area is less than 10 SQ miles, no reduction reflecting basin size is included.

A reduction of 20% is included to account for imperfect fit of basin and storm isohyets.

$\therefore$  6-Hour PMP = 17.6"

48 Hour PMP =  $1.27 (17.6) = 22.4"$

Since no inflow is considered and the spillway is assumed closed, the 48 Hour PMP is applied to the reservoir.